

AMIN TABRIZIAN

✉ amin_tabrizian@gwu.edu

🌐 linkedin.com/in/amin-tabrizian

🐙 github.com/amin-tabrizian

EDUCATION

The George Washington University

Washington, D.C.

PhD in Computer Science

2022 - 2026 (*Expected*)

- **Selected Coursework:** Vision-Language Models, Large Language Models, Machine Learning & Control, Design & Analysis of Algorithms, Advance Software Paradigms, Convex Optimization, Robotics Vision and Perception, Electromechanical Control Systems

University of Maryland

College Park, MD

Visiting Student in Computer Science

2023 - 2024

- **Selected Coursework:** Advanced Numerical Optimization, Natural Language Processing, Algorithms in Machine Learning: Design & Analysis

University of Tehran

Tehran, Iran

BSc in Mechanical Engineering

2017 - 2021

- **Selected Coursework:** Interactive Learning, Computer Vision, Statistics and Probability, Automatic Control, Mechatronics

RESEARCH INTERESTS

Research is focused on the development of **applied artificial intelligence systems** for **decision-making under uncertainty** in safety-critical domains. Core interests include **Generative AI and Large Language Models (LLMs)**, **agentic AI**, and **Retrieval-Augmented Generation (RAG)**, with an emphasis on robustness, safety, and explainability. The work integrates **Machine Learning, Reinforcement Learning, and control theory** to address challenges such as partial observability, delayed information, and scalable evaluation in real-world applications.

SELECTED PROJECTS

Using Large Language Models to Automate Flight Planning under Wind Hazards

2024 - Present

- Designed and implemented LLM-driven decision-support systems that translate complex, real-world constraints into actionable plans, emphasizing explainability, achieving a **98% validity rate**.
- Integrated wind hazard forecasts and route generation within a **185×110 km** simulated airspace, benchmarking performance against **A* algorithms** with only a **~2 km** average deviation in route efficiency.
- Developed agentic LLM architectures combining **Retrieval-Augmented Generation (RAG)**, **Chain-of-Thought (CoT)** reasoning, and external simulators to evaluate trade-offs between safety, efficiency, and cost.
- Conducted this work as part of a NASA-funded applied AI research collaboration with MIT Lincoln Laboratory and Honeywell, emphasizing real-world constraints and stakeholder-driven requirements.

LLM Jailbreaking and Safety Evaluation Framework

2025 - Present

- Designed a large-scale evaluation and **red-teaming** framework to assess LLM robustness, safety, and misuse risks in enterprise and customer-facing settings.
- Developed **automated adversarial prompting** and stress-testing pipelines to identify **jailbreak** vulnerabilities, reasoning failures, and policy violations across multiple LLM families.
- Built **batch inference**, streaming evaluation, and logging pipelines to support systematic model comparison and regression testing.
- Implemented fine-tuning and alignment strategies (e.g., parameter-efficient fine-tuning) to improve model reliability, controllability, and adherence to safety constraints.

Delay-Aware Highway On-Ramp Merging for Connected Vehicles

2022 - Present

- Designed a framework for autonomous merging under stochastic delays, modeling the problem as a **Random Delay MDP** to handle communication latencies up to **2.0 seconds**.
- Developed a **Delay-Aware Encoder** using GRUs to restore the Markov property by fusing delayed observations with masked action histories, enabling precise state inference.
- Implemented a unified **Soft Actor-Critic (SAC)** architecture for joint lateral-longitudinal control, integrated with a **physics-based safety controller** to enforce collision constraints.
- Achieved a **>99% success rate** in high-density traffic simulations (SUMO/US-101), significantly outperforming **MPC** and **DRL baselines** in safety and robustness.

RESEARCH EXPERIENCE

Intelligent Aerospace Systems Laboratory at George Washington University

Washington, D.C.

Graduate Research Assistant - Advisor: Prof. Peng Wei

2022 - Present

- Conduct applied research to design and deploy **robust, end-to-end GenAI and ML systems** in high-stakes environments, engineering production-quality Python/C++ solutions that integrate safety, scalability, and reproducibility.
- Lead simulation-driven experimentation and benchmarking, translating research outcomes into measurable performance metrics aligned with operational and business objectives.
- Collaborate cross-functionally with **government labs, industry partners**, and interdisciplinary research teams, presenting results to both technical and executive audiences.
- Mentor junior researchers and contribute to research planning, technical reviews, and project execution, demonstrating leadership in applied research settings.

TECHNICAL SKILLS

Programming and Tools: Python, C and C++, MATLAB/Simulink, Git, Linux

Machine Learning and AI: Large Language Models, Generative AI, Retrieval Augmented Generation RAG, Agentic AI, Deep Neural Networks, Reinforcement Learning, Computer Vision, Transfer Learning, Reasoning and Planning, Transformers, AI Safety, Model Evaluation and Alignment

Frameworks and Libraries: PyTorch, TensorFlow, Hugging Face, LangChain, scikit-learn, NumPy, Pandas

Research and Experimentation: Prompt Engineering, Parameter Efficient Fine Tuning (LoRA), LLM Security, Experimental Design, Data Structures and Algorithms

PUBLICATIONS

- **A. Tabrizian**, M. Ghazanfari, P. Wei. "Chain-of-Thought Flight Planner: End-to-End LLM Routing Under Wind Hazards" 2025 AIAA Aviation Las Vegas, NV (**Best Student Paper Award Winner**).
- C. Vu, M. Ghazanfari, K. Dong, A. Taye, **A. Tabrizian**, P. Wei. "Transformer or CNN? Benchmarking Real-Time Detection Transformer and YOLOv8 for small UAS autonomous landing" 2025 AIAA-Aviation Las Vegas, NV.
- J. Xu, C. Vu, A. Taye, **A. Tabrizian**, P. Wei. "Small UAS Landing Site Detection with ArUco Markers and Deep Learning based Computer Vision" 2025 AIAA-Aviation Las Vegas, NV.
- D. Ding, C. Vu, A. Taye, **A. Tabrizian**, P. Wei. "Synthetic Data Generation for Computer Vision based Autonomous Landing for Small UAS Package Delivery" 2025 AIAA-Aviation Las Vegas, NV.
- **A. Tabrizian**, Z. Huang, P. Wei. "LISA: Reinforcement Learning with Latent State Inference for Autonomous On-ramp Merging under Observation Delay" Submitted to IEEE Internet of Things Journal (under review), arXiv:2403.11852.
- **A. Tabrizian** et al. "Using Large Language Models to Automate Flight Planning under Wind Hazards," 2024 *IEEE Digital Avionics Systems Conference (DASC)*, San Diego, CA.
- A. Famili, **A. Tabrizian**, T. Atalay, A. Stavrou. "RADIO: Reinforcement Learning-Aided Deployment of Wi-Fi Routers in 5G Networks for Indoor Drone Orchestrating," 2024 *IEEE International Conference on Internet of Things (iThings)*, Copenhagen, Denmark.
- A. Famili, **A. Tabrizian**, T. Atalay, A. Stavrou, P. Wei. "RAPID: Reinforcement Learning-Aided Femtocell Placement for Indoor Drone Localization." 2024 *IEEE International Conference on Computer Communications and Networks (ICCCN)*, Big Island, HI.

- A. Famili, T. Atalay, **A. Tabrizian**, A. Stavrou. “GREEN: Precise Geolocation in Metaverse using Reinforcement Learning-Enabled Sensor Placement,” 2024 *IEEE Metaverse Computing, Networking and Applications (MetaCom)*, Hong Kong, China.
- P. Razzaghi, **A. Tabrizian** et al. “A Survey on Reinforcement Learning in Aviation Applications.” Engineering Applications of Artificial Intelligence, vol. 136, p. 108911, Oct. 2024.

INVITED TALKS

- End-to-End LLM Flight Planning with RAG-based Memory and Multi-modal Coach Agent. Invited Technical Talk, **Honeywell Advanced Technology**, December 2025.
- **A. Tabrizian**, A. Aziz, A. Ullah, P. Razzaghi, P. Wei. “End-to-End LLM Flight Planning with RAG-based Memory and Multi-modal Coach Agent.” *INFORMS Annual Meeting*, Atlanta, GA, 2025.
- **A. Tabrizian**, M. Ghazanfari, P. Wei. “Chain-of-Thought Flight Planner: End-to-End LLM Routing Under Wind Hazards.” *AIAA Aviation Forum*, Las Vegas, NV, 2025 (**Best Student Paper Award Winner**).
- **A. Tabrizian**, P. Gupta, A. Taye, J. Jones, E. Thompson, S. Chen, T. Bonin, D. Eberle, P. Wei. “Using Large Language Models to Automate Flight Planning Under Wind Hazards.” *AAAI 2025 Spring Symposium Series*, San Francisco, CA, 2025.
- A. Famili, **A. Tabrizian**, T. Atalay, A. Stavrou, P. Wei. “RAPID: Reinforcement Learning-Aided Femtocell Placement for Indoor Drone Localization.” *IEEE International Conference on Computer Communications and Networks (ICCCN)*, Big Island, HI, 2024.
- **A. Tabrizian** et al. “Using Large Language Models to Automate Flight Planning under Wind Hazards.” *INFORMS Annual Meeting*, Seattle, WA, 2024.

HONORS AND AWARDS

- Neil Y. Chen Memorial **Best Student Paper Award** in the Air Transportation Systems Track at AIAA Aviation 2025

PROFESSIONAL AFFILIATIONS

American Institute of Aeronautics and Astronautics (AIAA), Student Member
Institute of Electrical and Electronic Engineers (IEEE), Student Member
Institute of Electrical and Electronic Engineers (IEEE) Computer Society, Student Member
Institute for Operations Research and the Management Sciences (INFORMS), Student Member

PROFESSIONAL SERVICES

Conference Session and Workshop Organizer

• NASA System-Wide Safety Program Workshop	2025
• Safe and Reliable AI Workshop	2024

Reviewer Activities

• Journal of Aerospace Information Systems	2022-2025
• American Institute of Aeronautics and Astronautics’ (AIAA) Aviation Conference	2025
• Journal of IFAC Engineering Applications of Artificial Intelligence	2024

TEACHING EXPERIENCE

Teaching Assistant, Measurement Systems and Instrumentation	2021
Teaching Assistant, Interactive Learning	2021
Teaching Assistant, Introduction to Artificial Intelligence	2021
Teaching Assistant, Automatic Control	2021
Teaching Assistant, Statistics and Probability	2020